DRAFT Responses to Low Level Radiologocial Waste Evaluation Associated with Various Base Realignment and Closure Activities, April 30, 2011

Cmt. #	Page or Sheet	Section/Para/ Line #	Commentor Name	Comment	Comment Response
J1	2	1.0 Introduction, line 1	JHW	Although the practices in here are representative on how we perform radiological investigations in general-the data is representative of the sanitary and storm water sewer remediation, we should probably give more background information on that . The procedures used in here could possibly work better for a situation were gross contamination were to be observed at HPS/	Text has been added to the introduction explaining that the data sets analyzed in this report are from the sanitary sewer system remediation. Many of the procedure modifications suggested would apply equally well in more contaminated conditions, however, false detection at background levels would be less of an issue.
J2	2	2.0, line 40	JHW	Should we spell out the first use of reoccurring units -if so check globaly	Picocurie per gram is now spelled out at first use and abbreviated as pCi/g thereafter.
J3	2	2.0, line 43	JHW	This is the standard for trenches, we may at times have different background number for surface soils. We could limit this discussion to trench soils or we could expand the discussion to include alternative scenarios for surface soils.	It is our understanding that the background reference area was sampled at the surface and used for all site soil comparisons in the analyzed data sets (2009 and 2010 TUs and ESUs), including subsurface trench soils. In any case, an appropriate reference area data set should be used for comparisons. No changes have been made in response to this comment.
J4	2	2.0, line 43	JHW	Tie in the use of the word "criterion" here	The term “criterion” has been added in reference to the 1 pCi/g above background standard.
gpb1	3	2.0, line 9	GPB	I think the # is 18 samples collected from the same reference area as the lab samples.	Since this text is referring to the towed array gross activity measurements, the mentioned mean and standard deviation

Cmt. #	Page or Sheet	Section/Para/ Line #	Commentor Name	Comment	Comment Response
					results would refer to the number of individual towed array measurements within the reference area, not the number of discrete laboratory samples typically collected. The towed array collects on the order of 1,500 gross activity measurements on a pad. The text has been revised accordingly.
J5	3	2.0, line 22	JHW	This has been the practice, but we have discussed with RASO changing this procedure.	Such a change would be recommended.
J6	4	3.0, line 10	JHW	This is our practice, I am not sure if it is not a self imposed criteria.	It appears that it is a self-imposed practice, which should allow substantial latitude in revising it.
J7	4	3.0, line 23	JHW	This is true the Navy has looked at other background areas but derive the specific background on just one set of 18 samples. So we have multiple background numbers but the one we selected for the trenches is based on one set of 18.	One of the recommendations of this review is to establish a more robust and representative background data set. This could be done by collecting more samples from a single reference area, using multiple reference areas for different site areas, or a combination of both of these.
J8	4	3.0, line 30	JHW	We might want to reword this. The challenges of using the current cleanup goal of 1 pCi/g above the assumed background concentration of ….. We really didn't do a background study but assumed that the one trench (18 samples) would be representative of Hunters Point	While the point of the comment is well taken, the text has not been revised so as not to complicate the point being made here. The issue raised in the comment is addressed elsewhere in the report.
J9	4	3.0, line 40	JHW	Can this be combined with the previous bullet -is the natural variability due to the change in soil type or is there another factor independent of the soil type if so can we clarify that natural variability	The two bullets have been combined. The variability of measured Ra-226 levels also includes an additional factor of measurement uncertainty, which can result in measurements at background levels exceeding cleanup levels.

Cmt. #	Page or Sheet	Section/Para/ Line #	Commentor Name	Comment	Comment Response
J10	5	3.0, line 1	JHW	Is noise a factor of low energy, count time? Sample media?	Noise, in the case of Ra-226 results, is a result of several factors, dominated by high counting uncertainty due to low gamma ray efficiency (few gammas per disintegration). Other factors include spectral background level at the gamma ray energy and variation in interference levels in the 186 KeV gamma peak.
J11	5	3.0, line 4	JHW	Interference by other naturally occurring isotopes?	Yes, naturally occurring U-235 has a strong gamma ray at 186 KeV.
J12	5	3.1, line 34	JHW	We need to clarify ES and TU (Why, what, when, and where).	We have only the information provided in Tetra Tech spread sheets for 2009 and 2010 remediations. It is our understanding that these are all related to sewer line excavations and backfill.
J13	6	3.1, line 18	JHW	Reference the company or organization	The text has been revised to “Tetra Tech e-mail.”
J14	6	3.1, line 30	JHW	Although this is correct we need to reword this sentence. The lab may have a tendency to over report the actually Ra-226 but you can interpret this as also under reporting the values.	The sentence has been revised in accordance with the comment.
gpb2	6	3.1, line 41	GPB	Following this statement, please explain the source of measurement error that I assume is the source of the unreliable results.	A statement has been added noting that the source of the measurement error in question is discussed in Section 3.2. Presenting it here would preempt that discussion.
J15	8	Figure 1, line 1	JHW	Clarify this to a specific background area some may confuse this with site wide HPS background ..you can put a note on the bottom or change the Figure title	The figure title now includes the identification of the background area to which the figure relates.
J16	9	3.1, line 1	JHW	Each soil pad has	The sentence has been revised in accordance with the comment.
J17	9	3.1, line 7	JHW	Whether results observed to date in soil pads from	The proposed text change in the comment

Cmt. #	Page or Sheet	Section/Para/ Line #	Commentor Name	Comment	Comment Response
				the storm and sanitary sewer investigation appear to indicate contamination or simply	has been incorporated.
J18	9	3.1, line 46	JHW	This approach was recommended by several entities. .	Comment noted.
J19	10	3.1, line 5	JHW	This was tried in the past	Our experience at Fernald suggests that the proposed direct measurement of Ra-226 can be done successfully at levels of interest at HPS. The method may also be used to simultaneously screen for Cs-137.
gpb3	12	3.2, line 27	GPB	Will increased accuracy tend to decrease the estimated background activity level?	It would if the past measurements are biased high, which they might be as seen by a comparison of Ra-226 results to Bi-214 results; plus the known interference issue with the Ra-186 KeV gamma from background uranium; and from the use of a single energy line (186 KeV), instead of multiple energy lines, as is typically done.
J20	13	3.3, title	JHW	**HPS Ra-226 Background Interpretation**	Empty comment balloon.
J21	13	3.3, line 24	JHW	I think I made this comment earlier but we need to explain what an ES and TU is and a little bit more about the sanitary/stormwater sewer remediation project	Please provide relevant text.
J22	13	3.3, line 24	JHW	I think I know what you are saying here but it is missing something to make it clearer.	The paragraph has been revised to clarify the point being made.
J23	13	3.3, line 34	JHW	We are trying to say that Ra-228 would not have been introduced by the Navy as a contaminant? All would be NORM? and that there is a particular relationship we can observe between Ra-226 and Ra-228.	Correct, except that background Ra-228 would not be considered NORM in this case, but simply soil background. (NORM suggests some concentration or displacement of natural radium, such as in drilling materials.) Radium commodities would be highly enriched in Ra-226 relative to Ra-228, having been prepared from Ra-226 rich material, such as

Cmt. #	Page or Sheet	Section/Para/ Line #	Commentor Name	Comment	Comment Response
					pitchblende. We would expect to see high ratios of Ra-226/Ra-228 in contaminated areas.
J24	14	3.3, line 19	JHW	Shouldn't this be Ra-226 that was calculated from the Bi-214 progeny	Yes, the text has been changed in accordance with the comment.
J25	15	Figure 3	JHW	Can we put avg in front of the Ra-226 and Ra-228 numbers	The title of the figure has been revised to indicate that the Ra-226 and Ra-228 values given in the figure are averages.
gpb4	17	3.3, line 25	GPB	We will have far more luck re-estimating background than it would to renegotiate 1 + background. It's not that clear which of the two you are suggesting for renegotiation.	The bullet has been modified to clarify that the suggested change would be to the way the 1 pCi/g criterion is added to background. Specifically, it would be added to a high percentile of the background distribution, such as the 95th percentile, rather than to the mean of background. In addition, the full extent of the background distribution (variability) would be captured for the full range of soil types on site.
gpb5	17	3.4, line 40	GPB	Can we quantify the number of times that new contamination was identified by additional systematic sampling?	Contamination would have been identified at approximately the rate that systematic samples have historically triggered a hit, or about 3-8% of time (Table 1). However, as this review has shown, the great majority of such "hits" are likely due to measurement uncertainty and soil background variability and are not truly above the criterion.
gpb6	18	3.4, line 5	GPB	Please consider what is meant by "current practice". If you are referring to laboratory methods, recall that we have new detectors now.	The "current practice being referred to is that of additional systematic sampling, which has not yet been revised. The text has been modified to clarify this.
gpb7	18	3.4, line 35	GPB	Does this mean we calculate a new background	No, it does not. It means that a pad would

Cmt. #	Page or Sheet	Section/Para/ Line #	Commentor Name	Comment	Comment Response
				for each pad?	be treated as a single decision unit and released only after the pad-wide average met the cleanup criterion, based on systematic samples, and any small elevated areas met a second, higher, elevated measurement comparison criterion. This implies that some individual measurements could exceed the criterion, as long as the pad as a whole meets it. Data for all pads would be compared to that for an appropriate background reference area, or a consolidated background data set.
J26	16	3.4, line 36	JHW	Should we pull a little of the Section 2 discussion on characterization and insert in here.	The inserted text referring to Section 2 has been incorporated to address this comment.
J27	18	3.5, line 27	JHW	If we were to limit bias sampling to 3 stdev from the gross mean activity (normal distribution) and the 18 systematic samples that would be an improvement too.	A bullet has been added to the conclusions section reflecting the recommendations in Sec 3.4, which most directly address the point of this comment.
gpb8	20	3.5, line 22	GPB	Consider these two thoughts.	Two new bullets to the effect offered in the comment have been added to the text. Note that Bi-214 would still be preferred to direct Ra-226 measurement, even if no bias is present. Bi-214 has the advantage of lower MDA due to lower counting uncertainty (stronger gamma peaks) and multiple gamma ray energies to use to correct for interference in any single gamma energy.